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of Gulf War Veterans

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Table of Contents

Cover.....	1
SF 298.....	2
Table of Contents.....	3
Introduction.....	4
Body.....	4-9
Key Research Accomplishments.....	4-7
Reportable Outcomes.....	7
Conclusions.....	7-8
References.....	9
Appendices.....	9

Annual Report:
Physical, Mental, Social, and Family Health Outcomes of Gulf War Veterans

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Introduction

This research builds on efforts to understand the multifaceted health consequences for Gulf War veterans (GWVs) who were deployed to Desert Storm, many of whom were exposed to an array of conditions with potential health implications^{1,2} and who have reported a variety of physical³ and psychological^{2,4-7} health problems associated with deployment.¹⁻³ Secondary, longitudinal data are used to assess the health of GWVs, and changes in their health, in four domains: physical, mental, social, and familial. Multivariate statistics are used to identify deployment-related effects, independent of the demographic, social, military, or family background of veterans. Further, analyses of moderating effects identify variables such as ethnicity that may protect some subpopulations of veterans from adverse health consequences or, conversely, place them at greater risk. Three active military groups are examined – those who deployed to the Persian Gulf, those who deployed to other (noncombat) regions, and those who did not deploy at all. Thus, health and health changes among GWVs are assessed in light of experiences of two otherwise comparable groups, which much of the prior research has not been able to do.^{1,2} The capacity of troops to fulfill their duties depends heavily on positive health. The capacity of the military to meet the needs of its troops depends on information about the range of health problems veterans experience, the severity of these problems, and how problems manifest themselves over time. Results from this research can help inform military personnel and policy makers about resources and programs that can help veterans avoid or overcome negative effects of combat-related deployment.

Research Accomplishments

To date, data management tasks have been completed; for example, all files necessary for successful completion of the research have been identified, retrieved, and compiled into a single database used for cross-sectional (e.g., baseline) and longitudinal analyses. Early scrutiny of the military and deployment-related data revealed some inconsistencies over time. This occurred because the scope of the original project from which these data are based included collecting information on multiple people involved in the military and related to the same family unit, whether currently living with the family or not. For example, there are numerous situations where military and deployment data are available on a biological parent no longer living at home, as well as on the caregivers (e.g., parent and step-parent) who currently live in the family unit. Because one of our interests is in family well being and outcomes, we had to ensure that the data

we were identifying were consistently associated with the same person over time, and the appropriate person over time (i.e., the military person living in the home). While this exercise took longer than we anticipated, it was necessary to ensure data quality.

Tasks associated with assessing the multiple domains of health status are also largely completed. Results thus far suggest that the three groups of military – those deployed to the Persian Gulf (20%), those deployed to other (non-war zone) regions (27%), and active military (53%) not deployed at all – are comparable at baseline in regard to key factors, but differ in a few potentially important ways. Socio-demographically, the three groups are similar in terms of their ethnic composition (73% White; 19% Black; 6% Hispanic), educational attainment (19% college graduate), and annual household income (\$20-30,000). While those not deployed at all are somewhat more likely than those deployed to be Air Force than Army, the vast majority (over 85%) in each of the three groups served in the Army. Unsurprising, deployed military tend to be younger (33 yrs.) than the non-deployed active duty personnel (37 yrs.).

In terms of veterans' physical health status, the three groups are comparable in their baseline physical health overall ("good"), whether they have had any serious disability (4%), HIV/AIDS (.3%), cancer (1%), or other chronic illness (8%). However, the two deployed groups are less likely to have cardiovascular disease (.5%) than those not deployed at all (4%), a factor likely attributable to the younger age of deployed personnel.

In terms of mental health status, the three groups tend to be comparable in baseline rates of psychosis/schizophrenia (less than 1%), which differs from other reports, problems associated with the use of alcohol (14%), problems associated with the use of drugs (3%), and the use of outpatient services for emotional or drug-related problems (16%). However, troops deployed to the Gulf have a significantly higher rate (11%) of severe depression (before post-deployment reports) than those deployed elsewhere (3%). Although, the baseline rate of depression for GWVs is comparable to what we find for active duty, non-deployed personnel (11%), a finding that we continue to examine. Too, rates of inpatient care for emotional or drug-related problems differ between the groups. The rate among GWVs (6%) is significantly higher than the rate for troops deployed to non-combat zones (2%). However, their rate of service use for such problems is comparable to that found among active duty personnel who are not deployed (8%). Perhaps relatedly, the use of prescribed medication for emotional or drug-related problems also differs in similar ways, with higher rates among the nondeployed and Gulf-deployed, and a lower rate among those deployed to places other than the Gulf region.

The three groups appear comparable on various measures of social well being and normative behavior, with rates of arrest (16%), conviction (9%), probation (8%), and imprisonment (7%) roughly the same across groups.

Deployment status seems unrelated to most baseline measures of family well being, including resources to meet the family's basic needs, social supports, problem-solving

skills, communication, role identity/performance, affective responsiveness, involvement, behavior control, and general family functioning. However, military deployed to the Gulf are significantly more likely than those deployed to other regions to have sought mental health services for a child because of problems associated with their deployment.

Key Research Accomplishments

Specific Goals for Major Objectives	Completion Status
<p>I. Create database that includes all variables necessary for analyses.</p> <ul style="list-style-type: none"> ▪ Identify, download relevant disks/files from the original study ▪ Create new files, each structured appropriately for the specific analyses to be conducted (e.g., files with single records per case for cross-sectional analyses; files with multiple records per case for longitudinal analyses) ▪ Create database/file maps (e.g., lists of variables, label information, etc.) as references ▪ Conduct preliminary analyses to ensure completeness and integrity of database 	<p>x<input type="checkbox"/></p> <p>x<input type="checkbox"/> x<input type="checkbox"/> x<input type="checkbox"/></p>
<p>II. Describe the <i>physical, mental, social, and familial health</i> of GWVs and assess whether it differs appreciably from that of other era veterans.</p> <ul style="list-style-type: none"> ▪ Compute variables that summarize health status (e.g., count of problems within each of 4 domains; count of problematic domains; total problem count) ▪ Run univariate and bivariate procedures on health measures; review statistics for the significance of differences between GWVs and the two other groups ▪ Use multivariate techniques (e.g., regression) that include controls for confounding variables (e.g., propensity scores) to assess the independent effect of deployment, and of other variables, on health status ▪ Compare and assess statistics for the three comparison groups to see how status of GWVs compare to the other two groups (as well as how the two comparison groups compare) 	<p>x<input type="checkbox"/></p> <p>x<input type="checkbox"/></p> <p><input type="checkbox"/> x<input type="checkbox"/></p>

<p>III. Describe <i>changes in outcomes</i> and assess whether changes among GWVs differ significantly from those of other era veterans.</p> <ul style="list-style-type: none"> ▪ Create new variables that describe changes in health outcome measures ▪ Use bivariate techniques to assess changes by deployment status ▪ Use multivariate statistical models (e.g., HLM for continuous dependent variables) to identify any discernable patterns of change (e.g., problems diminish with time, increase with time) ▪ Use multivariate techniques (e.g., HLM) that include controls for confounding variables (e.g., propensity scores) to assess the independent effect of deployment, and of other variables, on changes in health outcomes ▪ Compare and assess statistics for the three comparison groups to see if changes of GWVs differed from those of the other two groups 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>IV. Identify subgroups of veterans (based on measures of demographic, social, military, and family background) who experienced either better or worse health outcomes than others, or different patterns of change in health outcomes.</p> <ul style="list-style-type: none"> ▪ Create new variables (interaction terms) that specify multiplicative effects of variables (e.g., BLACK*GULF will test whether the effect of deployment was same or different for black and white veterans). ▪ Run multivariate techniques (e.g., Multiple Regression; HLM) to identify significant variables that distinguish between different health outcomes or different patterns of change in outcomes. ▪ Conduct additional analyses to identify other variables that help explain how some background variable (e.g., ethnicity) differentially affects health outcomes or changes in outcomes. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Reportable Outcomes

There are no reportable outcomes/products (e.g., patents, degrees, employment, cell tissues) to date, though we expect to prepare manuscripts for publication toward the end of the study period.

Conclusions

Overall, results thus far suggest that the three military groups are comparable to one another at baseline before any outcomes associated with deployment, and deployment to the Gulf specifically, might manifest. There are some potentially important exceptions, however. Next steps include developing and testing multivariate models that can examine whether the few baseline differences we observe, such as rates of depression, might be attributable to variables (e.g., age) other than deployment status. Any such confounding variables will be statistically controlled in all subsequent

analyses. Moreover, the longitudinal assessments will be made to identify factors and degrees to which military personnel deployed to the Gulf differ from the other two groups at multiple time points post-deployment, as well as any patterns of change over time in the physical, mental, social, and familial health outcomes of veterans.

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Appendices (none)